

Remarks

The present amendment responds to the Official Action dated September 20, 2004. A petition for a one month extension of time to respond and authorization to charge Deposit Account No. 50-1058 the large entity extension fee of \$120 accompany this amendment. The Official Action objected to informalities in claims 1-22. The Official Action rejected claims 1-22 under 35 U.S.C. 112, second paragraph. The Official Action also rejected claims 1-3, 11-14 and 20-22 under 35 U.S.C. §103(a) based on Womack et al. U.S. Patent No. 5,982,819 (Womack) in view of Ivo et al. "DSP and Digital Down Conversion" Proceedings of the Radioelektronika 99, pp. 225-228 (Ivo). The Official Action rejected claims 4-6 and 15-17 under 35 U.S.C. §103(a) based on Womack in view of Ivo and further in view of Thacker U.S. Patent No. 6,011,548 (Thacker). The Official Action also rejected claims 7-10 and 18-19 under 35 U.S.C. §103(a) based on Womack in view of Ivo and further in view of Tourtier U.S. Patent No. 5,446,495 (Tourtier). These grounds of rejection are addressed below. Claims 1-9 and 11-22 have been amended to be more clear and distinct and new claims 23 and 24 have been added. Claims 1-24 are presently pending.

Amendments to the Specification

The section titled Related Applications and its accompanying paragraph are moved from page 3 to page 2 before the Background of the Invention as requested by the Official Action. The caption has also been changed to Cross-Reference to Related Applications as requested by the Official Action.

Serial number 09/695,647 for "APPARATUS AND METHOD FOR MULTI-CHANNEL COMMUNICATIONS SYSTEM", and serial number 09/695,536 for "APPARATUS AND METHOD FOR MULTI-CHANNEL RECEIVER" have been added as requested by the Official Action.

The paragraph beginning on page 2, line 24 has been amended to correct the U.S. Patent number incorrectly listed as 5,41,468 to 5,841,468 to correctly refer to the U.S. Patent titled "SYSTEM AND METHOD FOR ROUTING DATA MESSAGES THROUGH A CABLE TRANSMISSION SYSTEM" issued to Wright. Also, the title of U.S. Patent 6,100,883 has been changed from HOME INTERFACE CONTROLLERFOR PROVIDING INTERACTIVE CABLE TELEVISION to HOME INTERFACE CONTROLLER FOR PROVIDING INTERACTIVE CABLE TELEVISION to correct a typo.

The paragraph beginning on page 7, line 11 has been amended to correct an incomplete sentence so as to properly reference the two main elements of Figure 1. The sentence beginning on line 15 "In an illustrative embodiment, the system 100 a transmitter 102 and a receiver system 104." is amended to "In an illustrative embodiment, the system 100 includes a transmitter 102 and a receiver system 104."

The paragraph beginning on page 8, line 6 has been amended on line 11 to spell out the first use of the abbreviation DOCSIS in the Detailed Description section. For reasons of improved clarity, the phrase "non-overlapping channels of .2 MHz,.4 MHz,.8 MHz,1.6 MHz, or 3.2MHz" has been changed to "non-overlapping channels of .2 MHz, .4 MHz, .8 MHz, 1.6 MHz, or 3.2MHz" to add spacing between the channel frequency numbers. A typo on line 23 has been

amended by adding a period at the end of the sentence beginning on line 19 "In DOCSIS..." and ending on line 23 "...of Figure 2E." This same sentence beginning on line 19 has also been amended to change "as illustrated in the frequency diagram of Figure 2E." to "is illustrated in the frequency diagram of Figure 2E." to correct a typo. In this paragraph, an incorrect figure reference has also been corrected. At page 8, line 26, Figure 2 has been amended to Figure 3 to correctly reference the block diagram that includes cables 300, subscribers 302, and headend 304. Also, in this paragraph, the name of the element labeled 104 has been amended to correctly refer to element 104 as the receiver system as introduced in the first paragraph of the Detailed Description section beginning on page 7, lines 15-16.

The paragraph beginning on page 9, line 1 has been amended to correct a reference to the system illustrated in Figure 3. The communications system 100 of Figure 1 illustrates a system having a single transmitter 102. In the paragraph beginning on page 9, line 1 reference to system 100 has been amended to reference system 310 consistent with the discussion in the same sentence which addresses a system having multiple transmitters. The system 310 reference is also added to line 10.

The paragraph beginning on page 9, line 19 has been amended to change cable 408 to cables 408 to properly reference the multiple cables 408 that are shown in Figure 4. Also, optical fiber 410 has been amended to optical fibers 410 to properly reference the multiple optical fibers 410 that are shown in Figure 4.

The paragraph beginning on page 10, line 6 has been amended to correct an incorrect element reference in Figure 4. The reference to mini-headend 302 has been amended to mini-

headend 400, 402, 404 using the reference numbers 400, 402, 404 for the mini-headends introduced in the preceding paragraph beginning on page 9, line 19.

The paragraph beginning on page 10, line 25 has been amended to correct the abbreviated channel name for channel CHn to CHN to be consistent with the channel output names CH1, CH2, and CHN of baseband element 500 in Figure 5.

The paragraph beginning on page 11, line 13 has been amended to correct the name of element 600 in Figure 6 from a front end 600 to a front end processor 600. Support for this change can be found in the brief description of the drawings for Figure 6 which states that "Figure 6 is a conceptual block diagram of one embodiment of a front end processor in accordance with the present invention". Further support for this change can be found in the second sentence of this paragraph that begins "The front end processor 600..." and correctly identifies element 600 as a front end processor. Also, the paragraph has been amended to clarify the usage of 102.4 in line 21 to be 102.4 mega-samples per second. Support for this change can be found in the first sentence of this paragraph on page 11, beginning on line 13 where the sample rate of 102.4 mega-samples per second was introduced.

The paragraph beginning on page 12, line 1 has been amended to change the reference name for element 600 from a front end 600 to a front end processor 600 in the first three sentences of this paragraph. The mathematical term on line 11 $e^{j\omega_N n}$ is changed to $e^{j\omega_n n}$ to correct a typo consistent with the usage of the mathematical term in the same sentence defining ω_N , "where ω_N is the center frequency". This same sentence is further amended to remove a

period in line 12 changing "particular channel., to effect" to "particular channel, to effect" to correct a typo.

The paragraph beginning on page 13, line 8 has been amended to correct the abbreviated channel names "ch1, ch2, ch3; ch4; ch5, ch6, and chn1, chn2, chn3, and chn4" to "CH1, CH2, CH3; CH4; CH5, CH6, and CHN1, CHN2, CHN3, and CHN4" to be consistent with the channel names used in Figure 8.

The paragraph beginning on page 13, line 17 has been amended to remove a typographical error. The letter "a" is removed from line 19, changing "yielding a I/Q data streams representing the component channels" to "yielding I/Q data streams representing the component channels".

The paragraph beginning on page 14, line 14 has been amended at lines 16 and 17 to change "the front end described in the discussion related to Figure 6" to "the front end processor described in the discussion related to Figure 6" to correctly reference the front end processor in Figure 6 that is discussed on page 11, lines 16-19. A typographical error is corrected in line 19 changing "Such as system" to "Such a system". The reference numbers to the down-converters in Figure 7 have been amended in line 28 changing "converters 728 through 726" to "converters 702 through 726". Support for this change can be found in the preceding paragraph beginning on page 14, line 5 where the down-converters in Figure 7 were introduced.

The paragraph beginning on page 15, line 3 has been amended to correct the usage of "downconverter" in lines 15, 17, 18 and 19 and "down converter" in lines 16 to "down-converter" to be consistent with other usage of the term down-converter in this paragraph, such as that used

at line 6 which recites "down-converters (704, 706, 708)". For similar reasons of consistency, the term "downconversion" used in line 18 is amended to "down-conversion". In line 21, the "decimation filters 702 through 726 and the down-converters 728 through 752" are labeled incorrectly and have been amended to "decimation filters 728 through 752 and the down-converters 702 through 726" to be consistent with the naming of these elements as used in the specification. For example, the paragraph beginning on page 14, line 5 identifies the "down conversion stages 702 through 726" and the "decimation stages 728 through 752."

The paragraph beginning on page 19, line 8 has been amended in line 13 to change "A clock 1206" to "A clock 1203" to be consistent with the numbering of the clock, abbreviated as CLK 1203, used in Figure 12.

The paragraph beginning on page 19, line 23 has been amended to clarify the description of the elements 1218, 1220, 1224, and 1226 used in Figure 12. The short operational titles used for elements 1218, 1220, 1224, and 1226 in Figure 12 are included in parenthesis in the description of the elements. The "phase tracking loop 1218" is changed to "phase tracking loop (phase recovery) 1218" and the "phase tracking storage 1220" is changed to "phase tracking storage (phase state) 1220". Also, the "time tracking loop 1224" is changed to "time tracking loop (time recovery) 1224" and the "time tracking storage 1226" is changed to "time tracking storage (time state) 1226".

The paragraph beginning on page 20, line 4 has been amended to correct the channel reference number for channel N, changing I_n and Q_n to I_N and Q_N and changing in line 10 the phrase "data from the nth channel written into the nth data memory segment" to the phrase "data

from the Nth channel written into the Nth data memory segment". These changes have been made for consistency in the naming convention for channel N used in the specification and figures, such as Figs 5, 8, and 13, for example. Also, a typo at line 15 is corrected by changing the phrase "is least twice" to the phrase "is at least twice".

The paragraph beginning on page 21, line 14 has been amended to correct the name of element 1206 in Figure 12 in lines 15 and 17 from "equalizer 1206" to "equalizer subsystem 1206". Support for this change can be found in the paragraph beginning on page 19, line 8 where the "equalizer subsystem 1206" is introduced at line 16.

The paragraph beginning on page 21, line 27 has been amended to correct the reference of channel n to channel N as used in Figure 13 in data memory 1204 and generally in the specification for the Nth channel. In line 28 of this paragraph, "channels 1 through "n" respectively" has been amended to "channels 1 through "N" respectively". On page 22, lines 6 and 8 of this paragraph, "three and n" has been amended to "three and N". Support for this change can be found in the paragraph beginning on page 20, line 27 where on page 21 channel N is discussed at lines 7-10.

The paragraph beginning on page 22, line 13 has been amended to correct a typographical error. A period in line 17 has been removed from the middle of a sentence.

The paragraph beginning on page 22, line 27 has been amended to change the reference to CH4 to CHN as illustrated in Figure 13 in the context of the discussion on channels 1, 2, 3, and N. For example, in this paragraph on page 23, beginning at line 1, the thirty-two locations of data memory 1204 in Figure 13 are described where "the first sixteen of which are allocated to

channel CH1, the next eight of which are allocated to channel CH2, the next four allocated to channel CH3, and the last four allocated to channel CHN."

The paragraph beginning on page 23, line 7 has been amended to correct an incorrect channel name and incorrect reference numbers. In line 8 of this paragraph, CH4 has been changed to CHN to properly reference the use of CHN in Figure 13. The references to elements 1218, 1220, and 1226 has been corrected in the description to be consistent with the elements labeled 1218, 1220, and 1226 in Figure 12 and Figure 13. In lines 10 and 11, "the phase tracking loop 1226" has been changed to "the phase tracking loop (phase recovery) 1218". In line 15, "the time tracking loop vector 1220" has been changed to "the time tracking loop vector 1226". In line 18, "the phase tracking loop vector 1226" has been changed to "the phase tracking loop vector 1220" and in line 23, "phase tracking loop state vector 1226" has been changed to "phase tracking loop state vector 1220".

The paragraph beginning on page 23, line 26 has been amended to correct two incorrect reference numbers and a typo. The "equalizer 1204" on page 24, line 1 has been amended to "equalizer 1208" to properly reference the equalizer 1208 in Figure 12. The "equaiizer 1208" has been amended to "equalizer 1208" to correct the misspelling. The "state vector 1226" has been amended to "state vector 1220" to properly reference the updated phase tracking loop state vector that is stored in the phase tracking storage (phase state) 1220.

The paragraph beginning on page 24, line 12 has been amended to correct a typographical error. The duplicate words "decision value" from line 23 are deleted.

Informality Objections to Claims 1, 4, 12-15, and 18

Claims 1, 4, 12-15, and 18 have been amended to be more clear and distinct. More particularly, claims 1, 4, and 12-18 have been amended to address the informality objections as discussed below.

Claim 1 has been amended to replace the phrase "the front end" with the phrase "the receiver front end", and to remove the duplicate term "data stream" from the term "data stream data stream". The use of the phrase "the component channel signals" was objected to by the Official Action and claim 1 has been amended by replacing the phrase "the component channel signals" with the phrase "a non-overlapping channel".

Claim 4 has been amended to spell out the abbreviation for DOCSIS as it appears in the claims for the first time in claim 4.

Claim 12 has been amended by replacing "non-overlapping," with "non-overlapping upstream channels,".

Claim 13 has been amended by replacing "down-converting" with "converting".

Claim 14 has been amended by replacing "a decimator receiving" with "receiving".

Claims 15-17 have been amended by replacing the phrase "down-converter and decimator down-convert and decimate" with the term "data stream".

Claim 18 has been amended by replacing "down-converting" with "converting".

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Claim 2 has been amended to replace the phrase "the component channels" with the phrase "the non-overlapping upstream channels" to address the lack of antecedent basis of rejection.

Claim 3 has been amended to replace the phrase "a decimator" with "a plurality of decimators". The phrase "the baseband channel signals" has been replaced with "one of the baseband channel signals". The phrase "the corresponding baseband channel signal" and the phrase "the respective channel" have both been replaced with the phrase "the received baseband channel signal". These amendments have been made to claim 3 to address the lack of antecedent basis of rejection.

Claims 5 and 6 have been amended to replace the phrase "wherein the front end" with the phrase "wherein the receiver front end" to address the lack of antecedent basis of rejection.

Claims 7-9 have been amended to replace the phrase "the frequency band" with the phrase "the upstream band of frequencies" to address the lack of antecedent basis of rejection.

Claim 11 has been amended to replace the phrase "the full-band analog signal" and the phrase "the entire band" with the phrase "the upstream band of frequencies" to address the lack of antecedent basis of rejection.

Claim 12 has been amended to replace the phrase "the component channel signals" with the phrase "the non-overlapping upstream channel signals" to address the lack of antecedent basis of rejection.

Claim 13 has been amended to replace the phrase “the component channels” with the phrase “the non-overlapping upstream channel signals” to address the lack of antecedent basis of rejection.

Claim 14 has been amended to replace the phrase “the corresponding baseband channel signal” with the phrase “the received baseband channel signal” to address the lack of antecedent basis of rejection.

Claim 18 and claim 19 have been amended to replace the phrase “the frequency band” with the phrase “the upstream band of frequencies” to address the lack of antecedent basis of rejection.

Claim 20 has been amended to replace the phrase “decimator decimating” with the phrase “decimating in decimators” to address the lack of antecedent basis of rejection. Also, claim 20 has been amended to replace the phrase “the frequency band” with the phrase “the upstream band of frequencies” to address the lack of antecedent basis of rejection.

Claim 21 has been amended to replace the phrase “decimator decimating” with the phrase “decimating in decimators” to address the lack of antecedent basis of rejection. Also, claim 21 has been amended to replace the phrase “the baseband channel” with the phrase “each of the baseband channel signals being decimated” to address the lack of antecedent basis of rejection.

Claim 22 has been amended by deleting the phrases “receiving the full-band analog signal”, “sampling the entire band”, and “and decimators” to address the lack of antecedent basis of rejection.

The Art Rejections

As addressed in greater detail below, Womack, Ivo, Thacker, and Tourtier do not support the Official Action's reading of them. Considering the amended claims, it is clear the rejections based upon various applied combinations of Womack in view of Ivo and further in view of Thacker and Tourtier is not supported by a careful reading of those references and the rejections based thereupon should be reconsidered and withdrawn. Further, the Applicant does not acquiesce in the analysis of Womack, Ivo, Thacker, and Tourtier made by the Official Action and respectfully traverses the Official Action's analysis underlying its rejection.

The Official Action rejected claims 1-3, 11-14 and 20-22 under 35 U.S.C. §103(a) based on Womack in view of Ivo. Womack discloses a modulation format adaptive messaging receiver for use in a selective messaging system. Womack's messaging receiver 400 uses a processor 401 that includes a digital signal processor (DSP) 405, a memory 410, a buffer 412, flexible resources 404, and one or more digital converters 411. Womack, col. 4, lines 20-24. Womack's messaging receiver does not disclose and does not make obvious a receiver front end that receives "digitally modulated signals operating in an upstream band of frequencies that is divided into two or more non-overlapping upstream channels, each channel flexibly centered on selected frequencies within the upstream band of frequencies, so long as the channels are non-overlapping", as claimed in claim 1 of the present invention. In the present invention, the channels in a band of frequencies may be flexibly centered at selected frequencies within the upstream band of frequencies to minimize the effect of interference. See page 8, lines 14-19 and page 11, lines 22-25, of the present specification, for example.

Womack states the digital converters 411 are digital down-converters which are preferably Analog Devices Model AD-6620 or AD-6640. "Each one selects a narrow band signal out of the wide band data and decimates the data down to greater than 12 bits of precision depending upon the amount of oversampling." Womack, col. 5, lines 35-38. Womack's stated selection of a narrow band signal out of the wide band data should not be interpreted to mean the channels are independent and non-overlapping such that they may be "flexibly centered on selected frequencies within the upstream band of frequencies" as claimed in claim 1 of the present invention. Further, Womack gives no indication that a down-converter shifts the center frequency of the incoming selected narrow band signal to "baseband, the down-converter shifting the non-overlapping channel to a baseline center frequency that is the same baseline center frequency for each channel", as presently claimed in claim 1 of the present invention. With a plurality of down-converters, Womack does not indicate that each of the plurality of down-converters shifts each narrow band signal to the same center frequency.

Ivo compares the Harris Semiconductor HSP50016, the HSP50214, and the Analog Devices AD6620 which are said by Ivo to be three integrated circuits (ICs) useful for DSP and Digital Down Conversion. Nowhere in this comparison of parameters, features, and critical sections of the three ICs in Ivo is there discussed the center frequency of an input signal to any of these ICs. Further, Ivo does not address whether a center frequency can be shifted to a specific baseline frequency. Consequently, Ivo does not cure the deficiencies of Womack as a reference, and the combination of Womack in view of Ivo does not make obvious the present invention.

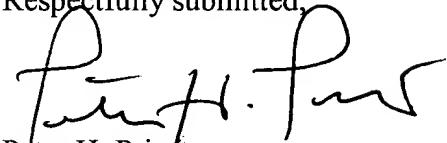
Dependent claims 4-6 and 15-17 were rejected under 35 U.S.C. §103(a) based on Womack in view of Ivo and further in view of Thacker. Thacker fails to cure the deficiencies of Womack in view of Ivo. Since claims 4-6 depend from and contain all the limitations of claim 1 as presently amended and claims 15-17 depend from and contain all the limitations of claim 12 as presently amended, claims 4-6 and 15-17 distinguish from the references in the same manner as claims 1 and 12, respectively.

Dependent claims 7-10 and 18-19 were rejected under 35 U.S.C. §103(a) based on Womack in view of Ivo and further in view of Tourtier. Tourtier fails to cure the deficiencies of Womack in view of Ivo. Since claims 7-10 depend from and contain all the limitations of claim 1 as presently amended and claims 18-19 depend from and contain all the limitations of claim 12 as presently amended, claims 7-10 and 18-19 distinguish from the references in the same manner as claims 1 and 12, respectively.

Conclusion

All of the presently pending claims, as amended, appearing to define over the applied references, withdrawal of the present rejection and prompt allowance are requested.

Respectfully submitted,



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Annotated Sheet Showing Charges

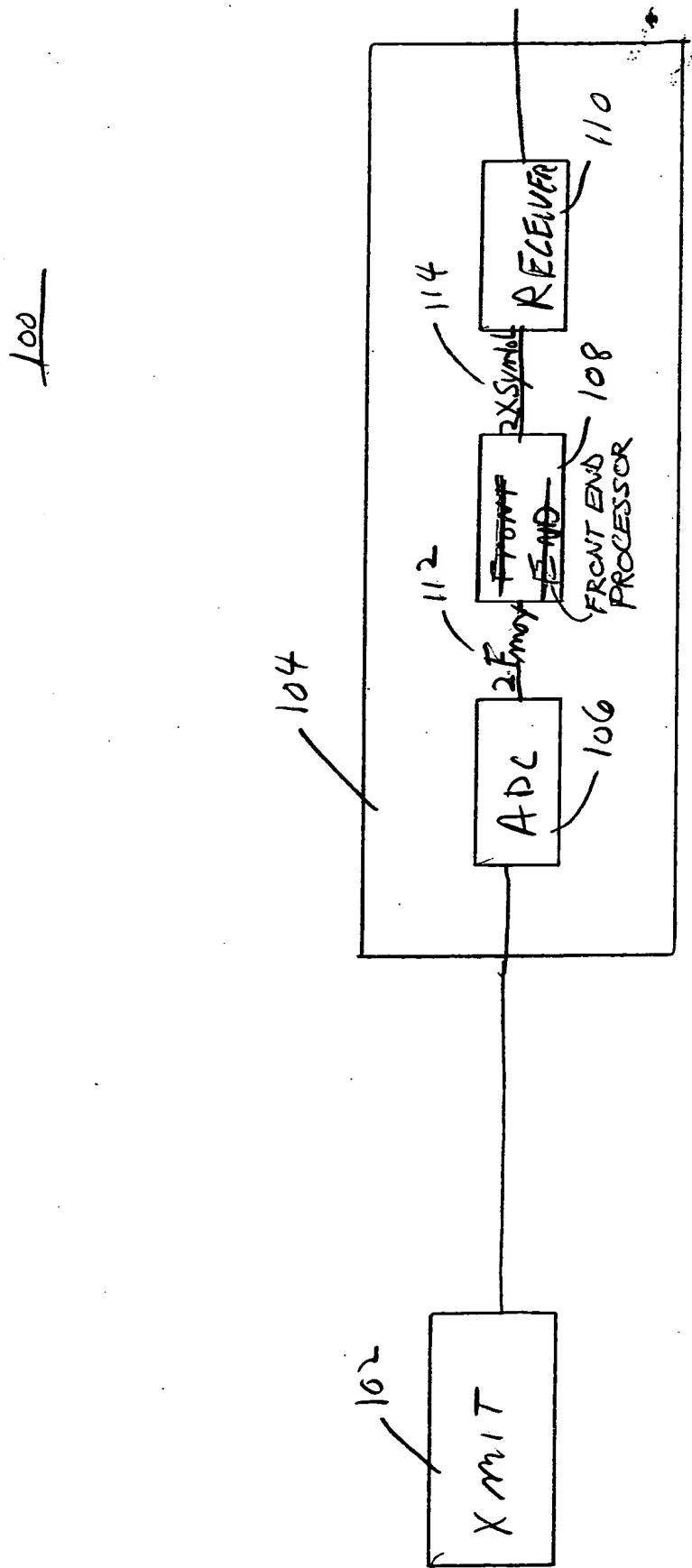


FIGURE 1

Annotated Sheet Showing Charges

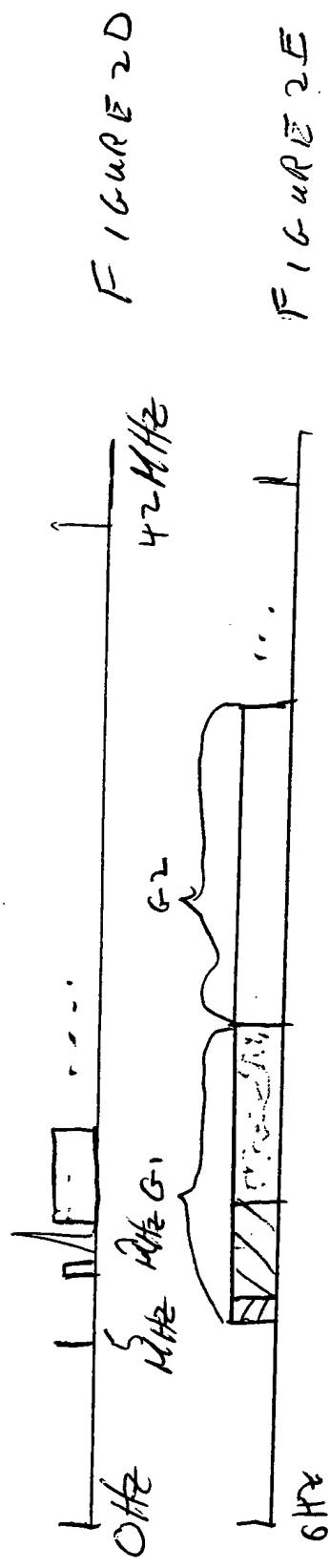
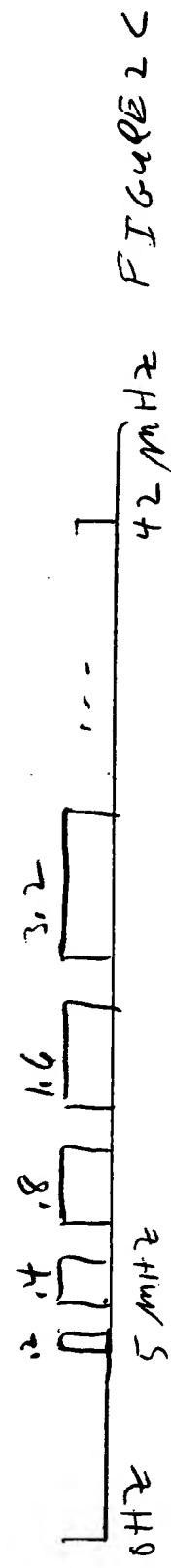
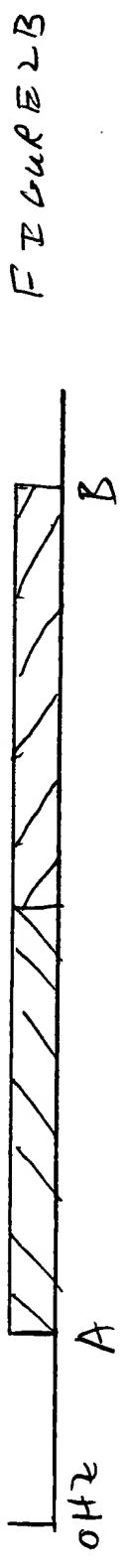
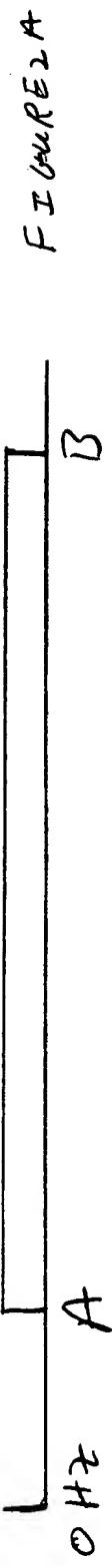


FIGURE 2E

Annotated Sheet Showing Changes

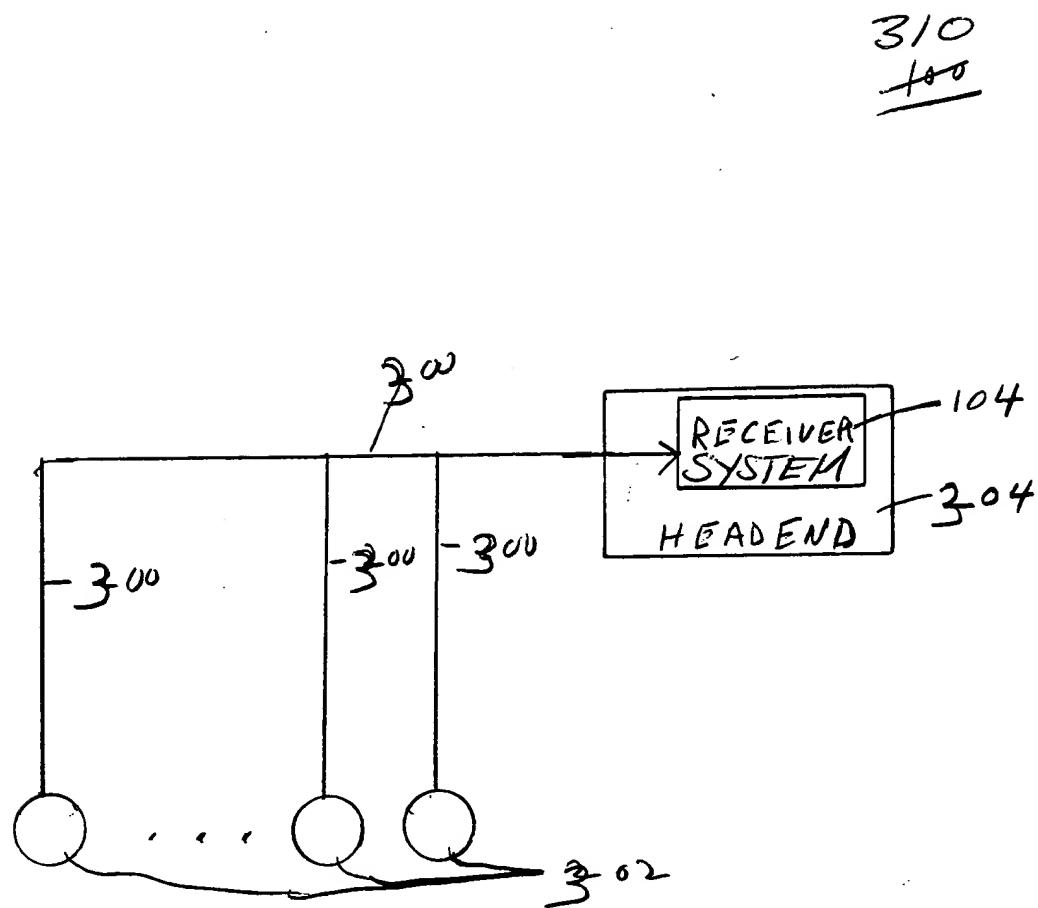


FIGURE 3

Annotated Sheet Showing Changes

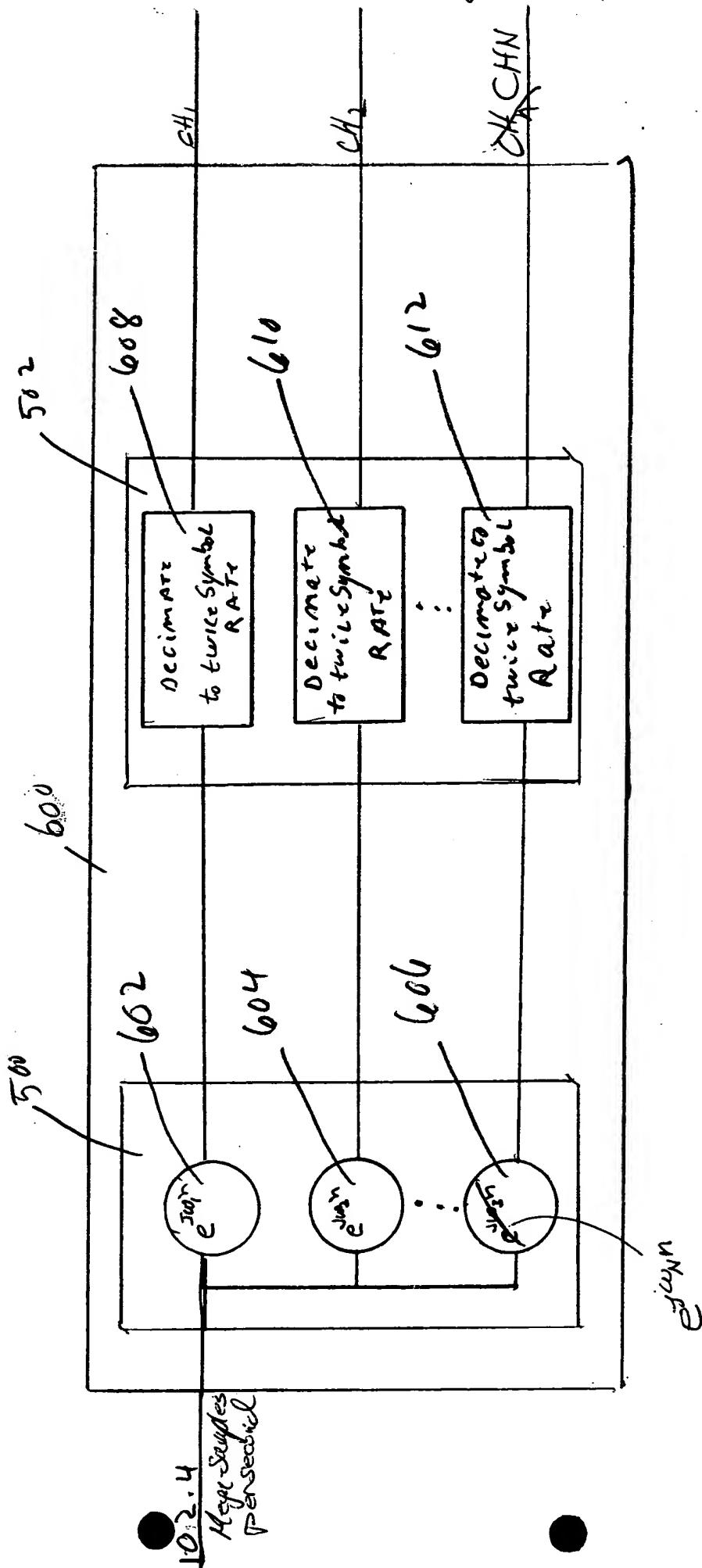


FIGURE 6

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FIG. 10

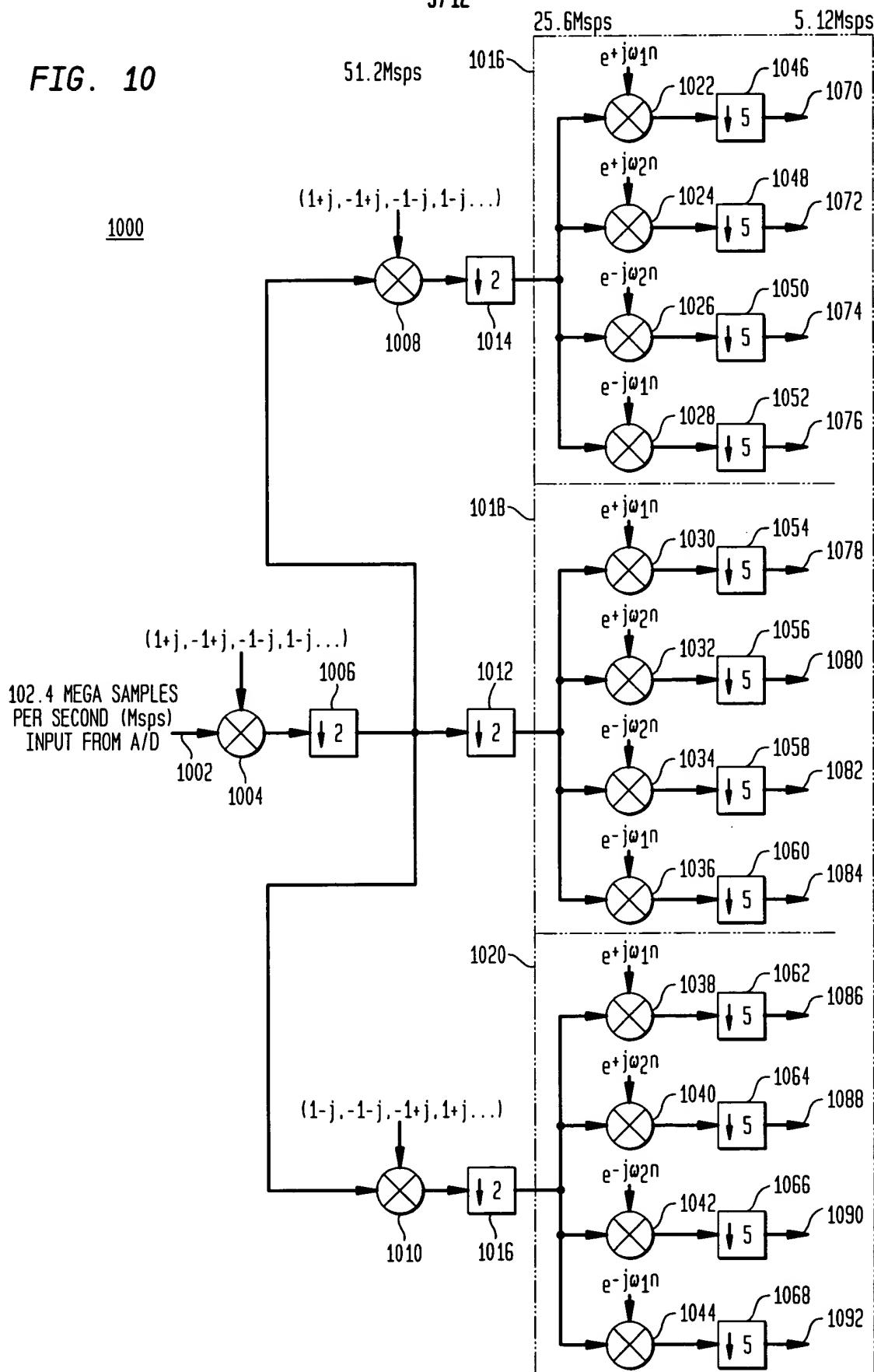


FIGURE 10

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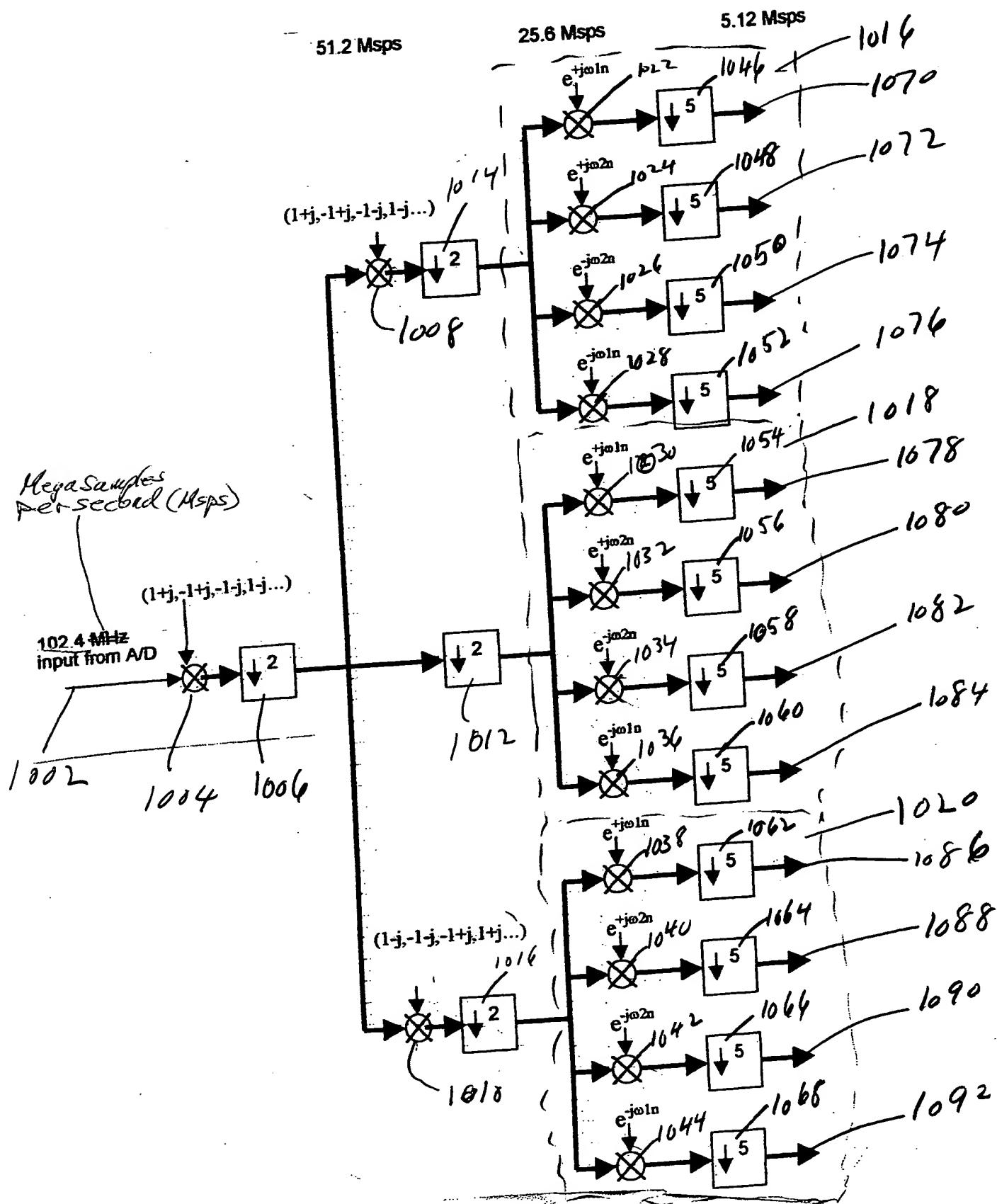
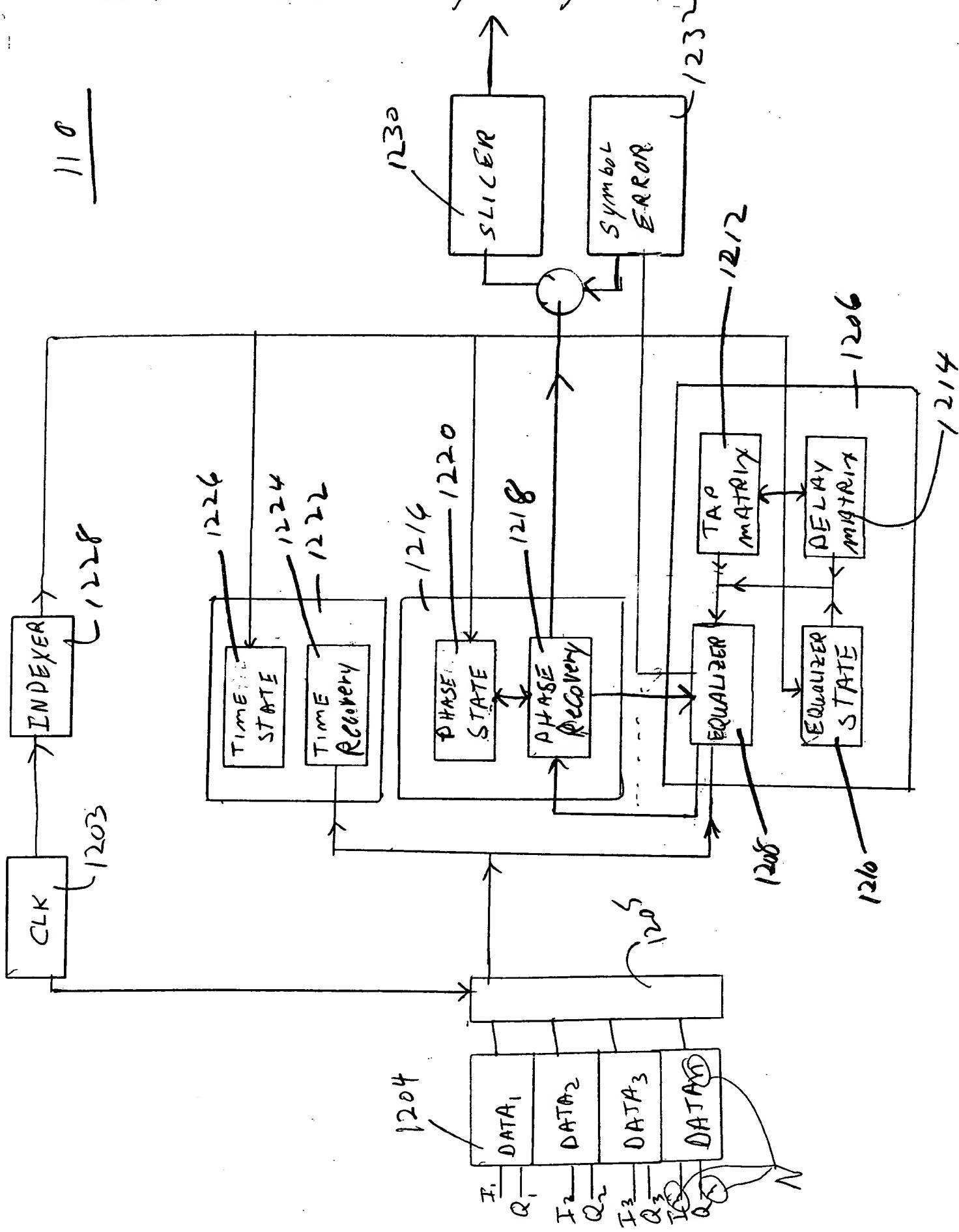


FIGURE 12

Annotated Sheet Showing Changes



Annotated Sheet Showing Charges

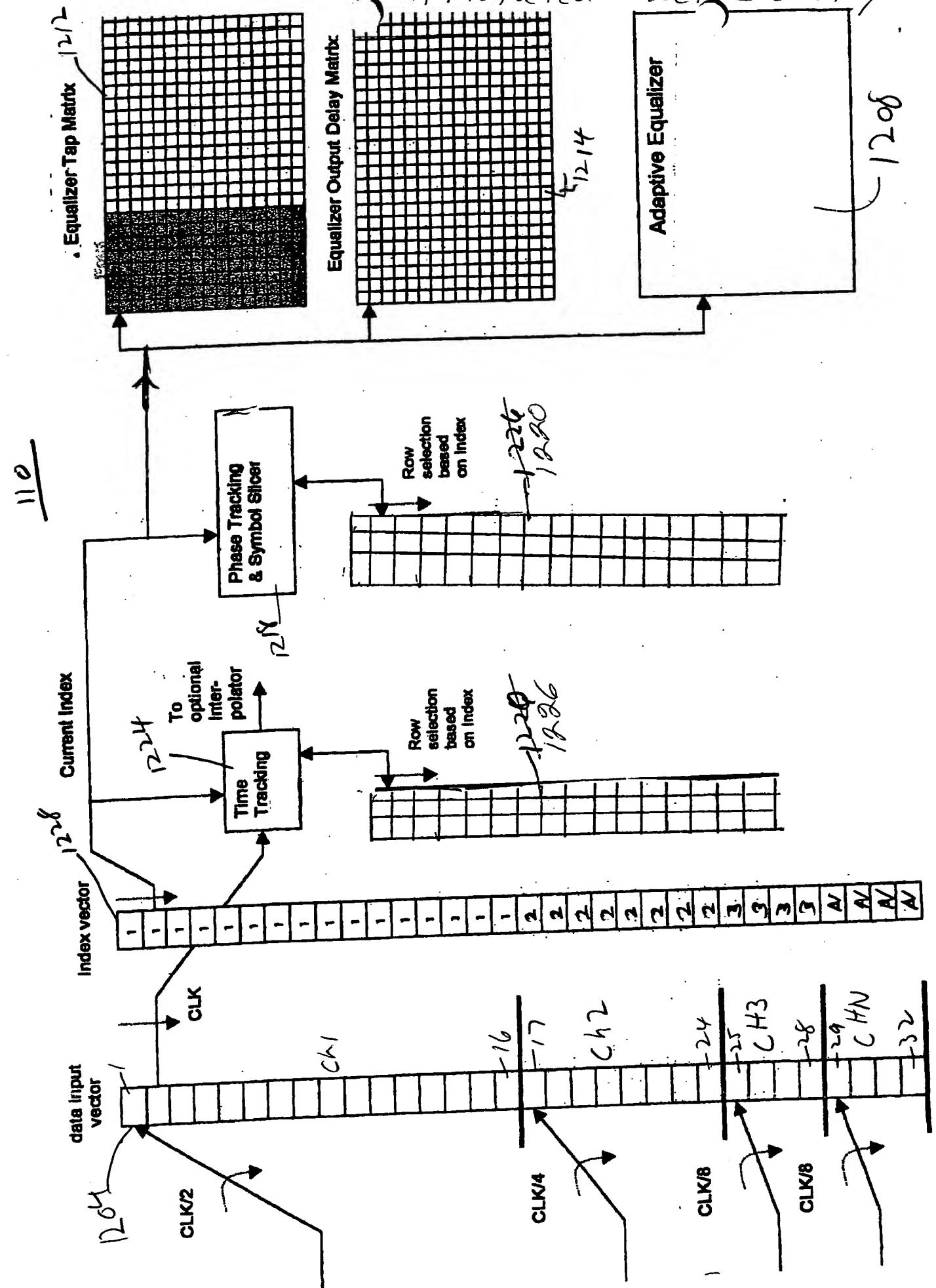


Figure 13